PATENT ABSTRACTS OF JAPAN

(11) Publication number : 2001-137743

(43) Date of publication of application : 22.05.2001

(51) Int.Cl. B04C 9/00
B01D 17/025
B01D 17/028
B23Q 11/00

(21) Application number : 11-321201

(22) Date of filing : 11.11.1999

(71) Applicant : BIYONZU KK

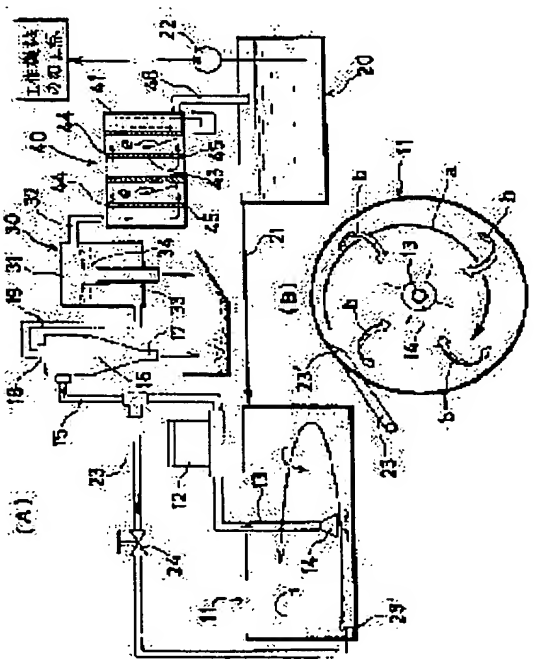
(72) Inventor : NOMURA HIDEYUKI

(54) APPARATUS FOR CLEANING AND RECOVERING COOLANT

(57) Abstract:

PROBLEM TO BE SOLVED: To continuously, without taking time and completely separate and remove processed chips, etc., without using an independent agitating device, thereby decreasing cost of an apparatus and without requiring the running cost of power, from a used coolant mixed with the processed chips, etc. such as swarf, cutting and abrasive grain discharge from various machine tools, and to circularly use the coolant.

SOLUTION: A dirty tank 11 for storing a used coolant containing processed chips and discharged from a machine tool is made to be a circular tank and a suction hole 14 of a pump 12 is opened on the bottom part of the center and a discharge pipe 15 of the pump is connected with a cyclone 16 and one end of a branch pipe 23 is connected with the midway of the discharge pipe and the apex 23' of the branch pipe is opened in the tangential direction in the circular tank of the dirty tank.



* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[The technical field to which invention belongs] This invention supplies used coolants (cutting oil etc.) including processing chips, such as scraps discharged from various kinds of machine tools, a chip, and an abrasive grain, etc. to a cyclone, and relates to purification of the coolant for separating and removing it, collecting them and carrying out the cyclic use of waste water of the processing chip etc., and a recovery system.
[0002]
[Description of the Prior Art] Prevent deformation of a product and a tool and distortion with the heat generated at the processing production process of the work by machine tools, such as lathe turning, cutting, and grinding, or reduce frictional resistance, such as cutting, and it prevents that improve the cutting effect etc., or scraps are caught between a work and a tool, and process tolerance falls, or the processing point of a work is filled with a lot of coolants at the time of processing of a machine tool for rust proofing of the product after processing etc. Therefore, from a machine tool, a lot of used coolants including a processing chip are discharged, and a dirty tank stores the coolant. With the foreign matter currently mixed, since different-species oil, such as suspended matter, such as a contaminant besides a processing chip, and slushing oil applied to the work, a lubricating oil supplied to the slide section of a machine tool, is being mixed to the used coolant, if long duration storage is carried out, a nasty smell will occur in a factory by putrefaction, and environmental aggravation, a sanitary problem, etc. will produce a coolant while it deteriorates and falls lubricative ability.
[0003]
[Problem(s) to be Solved by the Invention] For this reason, although the method of separating and removing a processing chip etc. and carrying out a reuse from a used coolant is variously proposed from the former, it is difficult not to spend many hours but to separate a processing chip etc. efficiently completely moreover continuously. For example, if a used coolant is filtered using a wire gauze or a mesh, a detailed processing chip smaller than a mesh is inseparable. dissociating, although a detailed processing chip is also separable if it filters using a paper filter (filtration paper) -- time amount -- ****** -- since it cannot carry out continuously -- a batch type -- not depending -- it does not obtain but effectiveness is bad. While being unable to perform removal of different-species oil moreover, costs are ****** to processing of the running cost of filtration paper and used filtration paper. Moreover, in a magnetic separator, since an abrasive grain cannot fully process, while flowing out and accumulating into a tank, it is restricted to the processing chip of a magnetic metal that it is separable, and processing chip of nonferrous metals, such as aluminum other than a magnetic metal (for example, stainless steel), separation of suspended matter and different-species oil, and removal cannot be performed.
[0004]
[Means for Solving the Problem] This invention was developed in order to cancel the above-mentioned trouble. Purification of a coolant of this invention, and a recovery system A dirty tank which stores a coolant discharged from a machine tool including a processing chip is made into a circular tub. While carrying out the opening of the sucking opening of a pump to that main pars basilaris ossis occipitalis, a discharge tube of this pump is connected to a cyclone, an end of a branch pipe is connected in the middle of this discharge tube, and it is characterized by making a tangential direction carry out the opening of the other end of a branch pipe into a circular tub of said dirty tank. And it is desirable to prepare a flow control valve in the middle of the above-mentioned branch pipe. Moreover, it is desirable to make it different-species oil, such as slushing oil with which floatation and a coolant removed and reproduced had adhered different-species oil which supplied a coolant discharged from a cyclone to a suspended matter decollator which generates a vortex, carried out separation removal of the suspended matter in a coolant, supplied to a floated oil decollator which moves in a zigzag direction and passes a coolant subsequently to a longitudinal direction, and was mixed in a coolant to suspended matter, such as a contaminant, and a work, not included.
[0005]

[Embodiment of the Invention] In the operation gestalt of illustration, the pump with a built-in motor with which the sucking opening 14 of the lower limit of a suction pipe 13 carried out the opening of the dirty tank as a circular tub which 11 accepts the used coolant discharged from a machine tool including a processing chip, and is stored, and 12 on the core of the bottom of the above-mentioned dirty tank, and 16 are well-known cyclones, and the regurgitation edge of the discharge tube 15 of said pump 12 is connected to upper part body 16' of a cyclone 16 in the tangential direction.

[0006] Therefore, if a pump 12 is operated by the motor, a pump sucks up the coolant which included the processing chip from the core of the bottom of the dirty tank 11 with the suction pipe 13, with a discharge tube 15, will pressurize in upper part body 16' of a cyclone 16, and will supply it to a tangential direction continuously. Thereby, inside a cyclone 16, a vortex arises, and being pushed against the wall of a cyclone with centrifugal force, it slides, and a processing chip heavier than a coolant gets down, and falls from the lower nozzle 17 of the core of a downward cone form. And what is necessary is to introduce this into the clean tank 20 for piping 19, and just to supply the point of a machine tool processing [work] with the return pipe 21 and the return pump 22 from a clean tank, since it is discharged from the up nozzle 18 which a coolant serves as a rise vortex, goes up in the part of a lower cone form, and projects upwards from the upper wall center of an upper part body. In addition, the processing chip which falls from the lower nozzle 17 of a cyclone is received in a suitable container.

[0007] It is desirable to form the suspended matter decollator 30, to remove suspended matter, such as a contaminant currently mixed in a coolant, to surface different-species oil, such as slushing oil currently subsequently to the inside of a coolant mixed according to the hydraulic jump etc. with the floated oil decollator 40, etc., and to remove, and to supply a clean tank in the middle of the piping 19 which leads the coolant discharged from a cyclone 16 to the clean tank 20, so that it may mention later.

[0008] Churning equipment is not used, but the processing chip currently mixed into the coolant in a dirty tank is brought together without the running cost of power in the center section of the bottom of this tank, in order to supply and dissociate and remove to a cyclone together with a coolant, a branch pipe 23 is connected in the middle of the discharge tube 15 of said pump 12, and the interior of a dirty tank is made to have carried out the opening of tip 23' of this branch pipe to the tangential direction.

[0009] A part of coolant fed by the cyclone 16 with a pump 12 by this flows into a branch pipe 23, and it is returned to the dirty tank 11. Within a dirty tank, since the opening of tip 23' of a branch pipe is carried out in the tangential direction into the dirty tank which is a circular tub, as shown in drawing 1 (A, B), Vortex a arises and the impurities b, such as a processing chip currently mixed into the used coolant discharged from the machine tool according to the stirring operation, suspended matter, and different-species oil, are collected in the center of a dirty tank by the coolant returned to the dirty tank with the branch pipe 23. Therefore, the sucking opening 14 of the lower limit of the suction pipe of the pump which carried out the opening on the core of the bottom of a dirty tank sucks up effectively these processing chips, suspended matter, different-species oil, etc. In addition, in order to assist that a processing chip etc. concentrates to the core of the bottom of a dirty tank, it is good for a center to make the bottom of this tank a low cone form.

[0010] And a flow control valve 24 is formed in the middle of a branch pipe 23, and the speed of the vortex a which carries out a stirring operation can be controlled to arbitration within a dirty tank by controlling the flow rate of the coolant which adjusts the opening and is returned to a dirty tank from a branch pipe 23. For example, when the specific gravity of a processing chip is heavy in comparison, opening of a flow control valve is made into size, the return flow rate of the coolant to a dirty tank is made [many], the stirring operation by the vortex in a dirty tank is strengthened, and the heavy processing chip of specific gravity etc. is effectively brought together in the center section of the bottom of a dirty tank. Moreover, since processing chips etc. gather in the center section of the bottom of a DATIN tank even if the stirring operation by the vortex is loose when the specific gravity of a processing chip is light in comparison, opening of a flow control valve is made into smallness, the return flow rate of the coolant to a dirty tank is lessened, the supply flow rate of the coolant to the part and a cyclone is made [many], and the separation effect of the coolant in a cyclone and the light processing chip of specific gravity is heightened.

[0011] The above-mentioned suspended matter decollator 30 has the cylinder tub 31 with a deep bottom several times (for example, three to 4 times) more greatly [a diameter] rather than up body 16' of a cyclone 16, and supplies the coolant discharged from the up nozzle 18 of a cyclone to a tangential direction for piping 19 at the pars basilaris ossis occipitalis of the above-mentioned cylinder tub 31. A coolant whirls around gently inside a cylinder tub by this according to the difference of the cross section of a cyclone 16 and the cylinder tub 31 with a big diameter, since the exhaust port 32 of a cylinder tub is formed in the upper limit section, within a tub, a rise vortex (drawing 2 c) arises, the different-species oil isolated from suspended matter and coolants, such as a contaminant, rides and goes up to a rise vortex, and it concentrates it in the center of an oil level. And penetrate

the ** ON exhaust pipe 33 in the center of the cylinder tub 31, establish a bottom in it, locate the upper limit of this pipe downward more slightly than the center section of the oil level, the interior of the ** ON exhaust pipe 33 is made to carry out ** ON of the suspended matter which this concentrated in the center of an oil level, or the different-species oil which surfaced from upper limit with a coolant, and it discharges in a suitable container from the lower limit of this pipe.

[0012] The degree to which the oil level in the cylinder tub 31 becomes the cone form where the center section which suspended matter concentrates according to a rise vortex is low, and a center section becomes low changes with the rates of flow of a rise vortex, and a center section becomes low, so that the rate of flow of a rise vortex is early. The rate of flow of this rise vortex becomes settled by the flow rate of the coolant supplied to a cyclone by the opening of the flow control valve 24 linked to a branch pipe 23, and changes by the size of that flow rate. Therefore, it is desirable to double ****** 34 which can adjust a location in the vertical direction with the bottom of the center section which became low [the oil level in a tub which suspended matter concentrates] about the level of the upper limit of anchoring and ****** 34 at the upper limit section of the ** ON exhaust pipe 33, to carry out ** ON of the suspended matter etc. efficiently, and to make it discharge.

[0013] The coolant from which the suspended matter which carries out the extravasation from the exhaust port 32 prepared in the tank wall of the cylinder tub 31 of a suspended matter decollator was removed is supplied to the processing tub 41 of the floated oil decollator 40 for piping 19. This processing tub 41 has two or more parallel passage 42-1 into which the shape of a plan type is a quadrangle and was divided by the dashboard 43, --42-n. By a diagram, the number of passage 42 is five, and after it flows toward the other end of this passage, it goes into the other end of the 2nd passage 42-2 from opening prepared in the other end of a dashboard 43, and the coolant supplied to the end of the 1st passage 42-1 from piping 19 goes to the end section of this passage, it moves in a zigzag direction by return, and flows. In this way, from an end, toward the other end, a coolant goes in the 5th passage 42-5 to the other end from an end toward the other end to an end in the 4th passage 42-4, and by return, while, it flows meanderingly in the 3rd passage 42-3, respectively.

[0014] The upper limit opening 44 and the lower limit opening 45 are formed in each dashboard 43 with which the 1st passage 42-1, the 2nd passage 42-2 and the 3rd passage 42-3, and the 4th passage 42-4 are divided at the other end. The upper limit opening 44 and the lower limit opening 45 are formed in the dashboard 43 with which the 2nd passage 42-2, the 3rd passage 42-3 and the 4th passage 42-4, and the 5th passage 42-5 are divided at the end section. Thereby, the 1st passage, the 2nd passage, the 3rd passage, the 4th passage, and the 5th passage constitute a series of meandering passage, and form the upper style and an undercurrent in a coolant.

[0015] Therefore, a coolant turns up close to the other end of the 2nd passage from the openings 44 and 45 of the upper and lower sides of the other end of the 1st passage to a dashboard. In case it moves in a zigzag direction, in the undercurrent of the coolant which flows deeply, goes under the opening 45 of the lower limit of a dashboard, and goes into the other end of the 2nd passage with d (drawing 3 A) which collides with the other end of the dashboard with which the 2nd passage and the 3rd passage are divided, a hydraulic jump e (drawing 1 A) generates the upper style and undercurrent of a coolant. According to the impact which collides with the other end of the dashboard with which the 2nd passage and the 3rd passage are divided, and the hydraulic jump d generated with the lower layer flow of a coolant, it dissociates from a coolant and the different-species oil suspended in a coolant surfaces.

[0016] The collision to the bridge wall of different-species oil suspended in a coolant and the floatation by the ** top phenomenon e Also in case close moves in a zigzag direction by return at the end of the 3rd passage from the end of the 2nd passage Since it is generated also in case close moves in a zigzag direction by return at the end of the 5th passage from the end of the 4th passage and rises to surface in the upper layer of the flow of a coolant each time also in case close moves in a zigzag direction by return in the other end of the 4th passage from the other end of the 3rd passage, the amount of the different-species oil contained in the style of [of a coolant] the upper layer increases gradually.

[0017] The upper styles of the coolant containing most different-species oil which flows into the end section of the 5th passage 42-5, and is turned up toward the other end are weir stop **** by the sheathing board 46 which opened the lower limit section of passage wide. Therefore, the ** ON extract pipe 47 which penetrated the bottom of a processing tub is formed in the end section of the 5th passage before this sheathing board 46, the upper limit of this pipe is located under an oil level, ** ON of the upper style of the coolant which contains many weir stop **** different-species oil by the above-mentioned sheathing board is carried out to a ** ON extract pipe, and it discharges in a suitable container from the lower limit of this pipe. Moreover, the coolant which went under the bottom of a sheathing board 46 is discharged on the clean tank 20 for piping 19 from the exhaust pipe 48 formed in the bottom of the other end of the 5th passage. The auxiliary sheathing board 49 located on the lower stream of a river of said sheathing board 46 in predetermined height from the bottom of passage is formed in the 5th passage. Go under the bottom of a sheathing board 46, and the coolant which carried out overflow of

the above-mentioned auxiliary sheathing board 49 top is discharged on a clean tank with an exhaust pipe 48. While keeping constant the oil-level level of the coolant which moves two or more of a series of passage in the processing tub 41 in a zigzag direction by the auxiliary sheathing board 49, and flows, it is desirable to enable it to extract the upper style of the coolant which always contains many different-species oil from the ** ON extract pipe 47.

[0018]

[Effect of the Invention] According to claim 1, impurities, such as a processing chip which the vortex was produced from the dirty tank to the cyclone in the dirty tank in the coolant which returned some coolants to the dirty tank with the branch pipe, and returned them from the middle of the discharge tube of the pump which carries out feeding supply of the coolant, and was mixed to the coolant in a dirty tank by this vortex, are brought together in the core of the bottom of a dirty tank. Therefore, a pump supplies the coolant containing many impurities to a cyclone, and separates an impurity from a coolant with a cyclone. Independent churning equipment is not used by this, the cost of equipment is reduced, and the running cost of power is not needed, but continuously, many hours cannot be spent, but, moreover, a processing chip can be completely separated and removed from a coolant efficiently, and the cyclic use of waste water of the reproduced coolant can be supplied and carried out to the processing point of the work of a machine tool. Moreover, according to claim 2, from a branch pipe, the opening of a flow control valve can be changed to size, and the flow rate of the coolant returned to a dirty tank can be adjusted. By this, when the specific gravity of the processing chip currently mixed into a coolant is heavy in comparison Make [many] the flow rate of the coolant returned to a dirty tank, and the heavy processing chips of specific gravity are effectively collected in the center section of the bottom of a dirty tank. It sucks up with a pump and a cyclone can be supplied. When the specific gravity of a processing chip is comparatively light At least, since processing chips gather in the center section of the bottom of a dirty tank, the flow rate of the coolant returned to a dirty tank lessens the return flow rate of a coolant. The flow rate of the coolant supplied to the part and a cyclone can be made [many], and a cyclone can separate the light processing chip of a coolant and specific gravity effectively. Floatation of suspended matter, such as a contaminant which is contained in the coolant after carrying out separation removal of the processing chip which was being mixed with a cyclone according to claim 3, and the different-species oil isolated from the coolant can be carried out, and it can remove, it can be made to be able to rise to surface compulsorily in the process in_which the passage where a single string moved the different-species oil subsequently to the inside of a coolant suspended in a zigzag direction is passed, it can remove, and the cyclic use of waste water can reproduce and carry out to the coolant which do contain an impurity.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] In purification of a coolant which stores in a dirty tank a coolant discharged from a machine tool including a processing chip, supplies this coolant to a cyclone, separates and removes it, collects them and carries out the cyclic use of waste water of the processing chip, and a recovery system While making a dirty tank into a circular tub and carrying out the opening of the sucking opening of a pump to the main pars basilaris ossis occipitalis, a discharge tube of this pump is connected to a cyclone. Purification of a coolant characterized by having connected an end of a branch pipe in the middle of this discharge tube, and making a tangential direction carry out the opening of the tip of a branch pipe into a circular tub of said dirty tank, a recovery system.
[Claim 2] Purification of a coolant characterized by preparing a flow control valve in the middle of the above-mentioned branch pipe in purification of a coolant according to claim 1, and a recovery system, a recovery system.
[Claim 3] Purification of a coolant which carries out separation removal of the suspended matter in a coolant, supplies a coolant discharged from a cyclone to a suspended matter decollator which generates a vortex, supplies a floated oil decollator which moves in a zigzag direction and subsequently passes a coolant, characterizes floatation different-species oil mixed in a coolant in purification of a coolant given in any 1 term of claim 1 and claim 2, and a recovery system, and is characterized by to remove, a recovery processor.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] (A) is the side elevation of 1 operation gestalt of this invention, and (B) is the plan of a dirty tank same as the above.
[Drawing 2] The plan of a suspended matter decollator.
[Drawing 3] (A) is the plan of a floatation unit, and explanatory drawing of a dashboard, and (B) is a cross section in a B-B line same as the above.
[Description of Notations]
11 Dirty Tank
12 Pump
13 Suction Pipe of Pump
14 Sucking Opening of Suction Pipe
15 Discharge Tube of Pump
16 Cyclone
17 Lower Nozzle of Cyclone
18 Up Nozzle of Cyclone
19 Piping
20 Clean Tank
21 Return Pipe
22 Return Pump
23 Branch Pipe
24 Flow Control Valve
30 Suspended Matter Decollator
31 Cylinder Tub of Suspended Matter Decollator
32 Exhaust Port of Cylinder Tub
33 ** ON Exhaust Pipe
34 ******
40 Floatation Unit
41 Processing Tub of Floatation Unit
42 Passage of Processing Tub
43 Dashboard
44 Upper Limit Opening of Dashboard
45 Lower Limit Opening of Dashboard
46 Sheathing Board
47 Extract Pipe
48 Exhaust Pipe
49 Auxiliary Sheathing Board

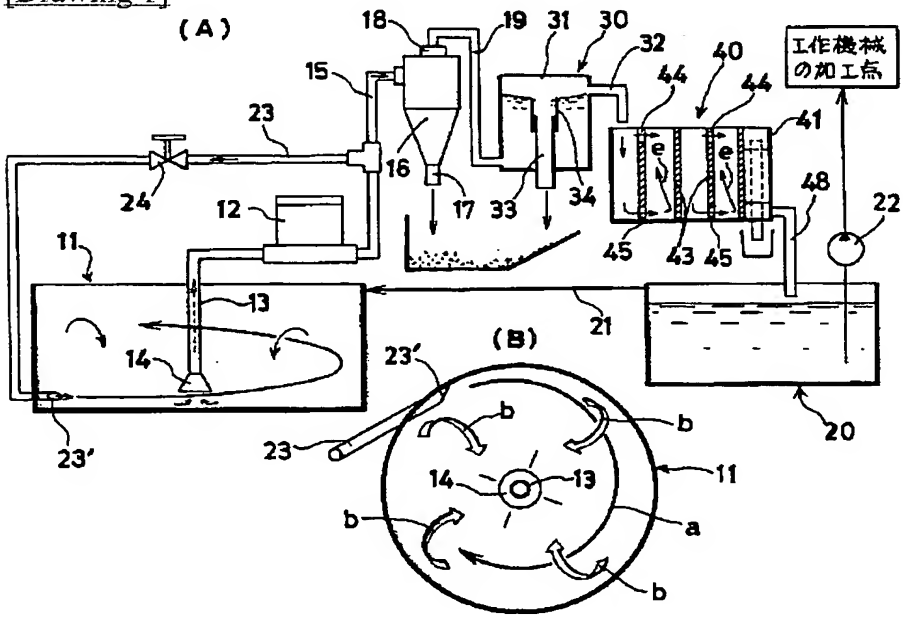
[Translation done.]

* NOTICES *

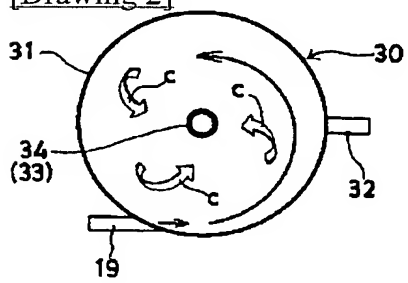
1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

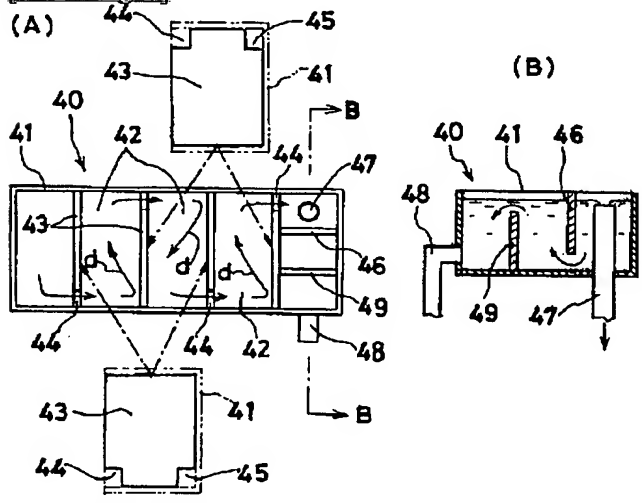
[Drawing 1]



[Drawing 2]



[Drawing 3]



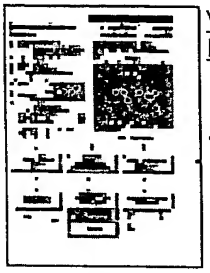
[Translation done.]

Title: **JP2001137743A2: APPARATUS FOR CLEANING AND RECOVERING COOLANT**

Country: **JP** Japan
Kind: **A2** Document Laid open to Public inspection

Inventor: **NOMURA HIDEYUKI;**

Assignee: **BIYONZU KK**
News, Profiles, Stocks and More about this company


View Image
1 page

Published / Filed: **2001-05-22** / 1999-11-11

Application Number: **JP1999000321201**

IPC Code: **B04C 9/00;**
B01D 17/025;
B01D 17/028;
B23Q 11/00;

Priority Number: 1999-11-11 **JP1999000321201**

Abstract:

PROBLEM TO BE SOLVED: To continuously, without taking time and completely separate and remove processed chips, etc., without using an independent agitating device, thereby decreasing cost of an apparatus and without requiring the running cost of power, from a used coolant mixed with the processed chips, etc. such as swarf, cutting and abrasive grain discharge from various machine tools, and to circularly use the coolant.

SOLUTION: A dirty tank 11 for storing a used coolant containing processed chips and discharged from a machine tool is made to be a circular tank and a suction hole 14 of a pump 12 is opened on the bottom part of the center and a discharge pipe 15 of the pump is connected with a cyclone 16 and one end of a branch pipe 23 is connected with the midway of the discharge pipe and the apex 23' of the branch pipe is opened in the tangential

direction in the circular tank of the dirty tank.

INPADOC Legal Status: None

Get Now: Family Legal Status Report

Family:

PDF	Publication	Pub. Date	Filed	Title
☑	**JP2001137743A2**	2001-05-22	1999-11-11	APPARATUS FOR CLEANING AND RECOVERING COOLANT
☑	JP1137743A2	2001-05-22	1999-11-11	LINE SWITCHING SYSTEM FOR INFORMATION COMMUNICATION SYSTEM
2 family members shown above				

Other Abstract Info: None